SEQUENCE LISTING

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atg aat aat gta tta aat aac gga aga act act att tgt gat gcg tat        48
Met Asn Asn Val Leu Asn Asn Gly Arg Thr Thr Ile Cys Asp Ala Tyr
1               5                   10                  15

aat gta gtg gcc cat gat cca ttt agt ttt gag cat aaa tca tta gat        96
Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser Leu Asp
            20                  25                  30

acc atc cga aaa gaa tgg atg gag tgg aaa aga aca gat cat agt tta       144
Thr Ile Arg Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His Ser Leu
        35                  40                  45

tat gta gct cct ata gtc gga act gtt tct agc ttt ctg cta aag aag       192
Tyr Val Ala Pro Ile Val Gly Thr Val Ser Ser Phe Leu Leu Lys Lys
    50                  55                  60

gtg ggg agt ctt att gga aaa agg ata ttg agt gaa tta tgg ggg tta       240
Val Gly Ser Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Trp Gly Leu
65                  70                  75                  80

ata ttt cct agt ggt agc aca aat cta atg caa gat att tta agg gag       288
Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu Arg Glu
                85                  90                  95

aca gaa caa ttc cta aat caa aga ctt aat aca gac act ctt gcc cgt       336
Thr Glu Gln Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu Ala Arg
                100                 105                 110

gta aat gcg gaa ttg gaa ggg ctg caa gcg aat ata agg gag ttt aat       384
Val Asn Ala Glu Leu Glu Gly Leu Gln Ala Asn Ile Arg Glu Phe Asn
        115                 120                 125
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1

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caa caa gta gat aat ttt tta aat cct act caa aac cct gtt cct tta      432
Gln Gln Val Asp Asn Phe Leu Asn Pro Thr Gln Asn Pro Val Pro Leu
    130                 135                 140

tca ata act tct tca gtt aat aca atg cag caa tta ttt cta aat aga      480
Ser Ile Thr Ser Ser Val Asn Thr Met Gln Gln Leu Phe Leu Asn Arg
145                 150                 155                 160

tta ccc cag ttc cgt gtg caa gga tac caa ctg tta tta tta cct tta      528
Leu Pro Gln Phe Arg Val Gln Gly Tyr Gln Leu Leu Leu Leu Pro Leu
                165                 170                 175

ttt gca cag gca gcc aat atg cat ctt tct ttt att aga gat gtt gtt      576
Phe Ala Gln Ala Ala Asn Met His Leu Ser Phe Ile Arg Asp Val Val
                180                 185                 190

ctc aat gca gat gaa tgg gga att tca gca gca aca tta cgt acg tat      624
Leu Asn Ala Asp Glu Trp Gly Ile Ser Ala Ala Thr Leu Arg Thr Tyr
            195                 200                 205

caa aat tat ctg aaa aat tat aca aca gag tac tct aat tat tgt ata      672
Gln Asn Tyr Leu Lys Asn Tyr Thr Thr Glu Tyr Ser Asn Tyr Cys Ile
    210                 215                 220

aat acg tat caa act gcg ttt aga ggt tta aac acc cgt tta cac gat      720
Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Thr Arg Leu His Asp
225                 230                 235                 240

atg tta gaa ttt aga aca tat atg ttt tta aat gta ttt gaa tat gta      768
Met Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Phe Glu Tyr Val
                245                 250                 255

tct atc tgg tcg ttg ttt aaa tat caa agc ctt cta gta tct tct ggc      816
Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser Ser Gly
                260                 265                 270

gct aat tta tat gca agc ggt agt gga cca cag cag act caa tca ttt      864
Ala Asn Leu Tyr Ala Ser Gly Ser Gly Pro Gln Gln Thr Gln Ser Phe
            275                 280                 285

act tca caa gac tgg cca ttt tta tat tct ctt ttc caa gtt aat tca      912
Thr Ser Gln Asp Trp Pro Phe Leu Tyr Ser Leu Phe Gln Val Asn Ser
    290                 295                 300

aat tat gtg tta aat ggc ttt agt ggc gct aga ctt acg cag act ttc      960
Asn Tyr Val Leu Asn Gly Phe Ser Gly Ala Arg Leu Thr Gln Thr Phe
305                 310                 315                 320

cct aat att ggt ggt tta cct ggt act act aca act cac gca ttg ctt     1008
Pro Asn Ile Gly Gly Leu Pro Gly Thr Thr Thr Thr His Ala Leu Leu
                325                 330                 335

gcg gca agg gtc aat tac agt gga gga gtt tcg tct ggt gat ata ggc     1056
Ala Ala Arg Val Asn Tyr Ser Gly Gly Val Ser Ser Gly Asp Ile Gly
                340                 345                 350

gct gtg ttt aat caa aat ttt agt tgt agc aca ttt ctc cca cct ttg     1104
Ala Val Phe Asn Gln Asn Phe Ser Cys Ser Thr Phe Leu Pro Pro Leu
                355                 360                 365

tta aca cca ttt gtt agg agt tgg cta gat tca ggt tca gat cga ggg     1152
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2

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Leu Thr Pro Phe Val Arg Ser Trp Leu Asp Ser Gly Ser Asp Arg Gly
    370                 375                 380

ggt gtt aat acc gtt aca aat tgg caa aca gaa tcg ttt gag tca act        1200
Gly Val Asn Thr Val Thr Asn Trp Gln Thr Glu Ser Phe Glu Ser Thr
385                 390                 395                 400

tta ggt tta agg tgt ggt gct ttt aca gct cgt ggt aat tca aac tat        1248
Leu Gly Leu Arg Cys Gly Ala Phe Thr Ala Arg Gly Asn Ser Asn Tyr
                405                 410                 415

ttc cca gat tat ttt atc cgt aat att tca gga gtt cct tta gtt gtt        1296
Phe Pro Asp Tyr Phe Ile Arg Asn Ile Ser Gly Val Pro Leu Val Val
                420                 425                 430

aga aat gaa gat tta aga aga ccg tta cac tat aat gaa ata aga aat        1344
Arg Asn Glu Asp Leu Arg Arg Pro Leu His Tyr Asn Glu Ile Arg Asn
            435                 440                 445

ata gaa agt cct tca gga aca cct ggt gga tta cga gct tat atg gta        1392
Ile Glu Ser Pro Ser Gly Thr Pro Gly Gly Leu Arg Ala Tyr Met Val
    450                 455                 460

tct gtg cat aat aga aaa aat aat atc tat gcc gtg cat gaa aat ggt        1440
Ser Val His Asn Arg Lys Asn Asn Ile Tyr Ala Val His Glu Asn Gly
465                 470                 475                 480

act atg att cat tta gcg ccg gaa gat tat aca gga ttc acc ata tcg        1488
Thr Met Ile His Leu Ala Pro Glu Asp Tyr Thr Gly Phe Thr Ile Ser
                485                 490                 495

ccg ata cat gca act caa gtg aat aat caa acg cga aca ttt att tct        1536
Pro Ile His Ala Thr Gln Val Asn Asn Gln Thr Arg Thr Phe Ile Ser
            500                 505                 510

gaa aaa ttt gga aat caa ggt gat tcc tta aga ttt gaa caa agc aac        1584
Glu Lys Phe Gly Asn Gln Gly Asp Ser Leu Arg Phe Glu Gln Ser Asn
            515                 520                 525

acg aca gca cgt tat aca ctt aga gga aat gga aat agt tac aat ctt        1632
Thr Thr Ala Arg Tyr Thr Leu Arg Gly Asn Gly Asn Ser Tyr Asn Leu
    530                 535                 540

tat tta aga gta tct tca cta gga aat tcc act att cga gtt act ata        1680
Tyr Leu Arg Val Ser Ser Leu Gly Asn Ser Thr Ile Arg Val Thr Ile
545                 550                 555                 560

aac ggt agg gtt tat act gct tca aat gtt aat act act aca aat aac        1728
Asn Gly Arg Val Tyr Thr Ala Ser Asn Val Asn Thr Thr Thr Asn Asn
                565                 570                 575

gat gga gtt aat gat aat ggc gct cgt ttt tta gat att aat atg ggt        1776
Asp Gly Val Asn Asp Asn Gly Ala Arg Phe Leu Asp Ile Asn Met Gly
                580                 585                 590

aat gta gta gca agt gat aat act aat gta ccg tta gat ata aat gtg        1824
Asn Val Val Ala Ser Asp Asn Thr Asn Val Pro Leu Asp Ile Asn Val
            595                 600                 605

aca ttt aac tcc ggt act caa ttt gag ctt atg aat att atg ttt gtt        1872
Thr Phe Asn Ser Gly Thr Gln Phe Glu Leu Met Asn Ile Met Phe Val
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3

cca act aat ctt cca cca ata tat taa   1899
Pro Thr Asn Leu Pro Pro Ile Tyr
625   630

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<211>   632
<212>   PRT
<213>   Bacillus thuringiensis

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Met Asn Asn Val Leu Asn Asn Gly Arg Thr Thr Ile Cys Asp Ala Tyr
1   5   10   15

Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser Leu Asp
                20   25   30

Thr Ile Arg Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His Ser Leu
            35   40   45

Tyr Val Ala Pro Ile Val Gly Thr Val Ser Ser Phe Leu Leu Lys Lys
    50   55   60

Val Gly Ser Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Trp Gly Leu
65   70   75   80

Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu Arg Glu
                85   90   95

Thr Glu Gln Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu Ala Arg
                100   105   110

Val Asn Ala Glu Leu Glu Gly Leu Gln Ala Asn Ile Arg Glu Phe Asn
                115   120   125

Gln Gln Val Asp Asn Phe Leu Asn Pro Thr Gln Asn Pro Val Pro Leu
    130   135   140

Ser Ile Thr Ser Ser Val Asn Thr Met Gln Gln Leu Phe Leu Asn Arg
145   150   155   160

Leu Pro Gln Phe Arg Val Gln Gly Tyr Gln Leu Leu Leu Leu Pro Leu
                165   170   175

Phe Ala Gln Ala Ala Asn Met His Leu Ser Phe Ile Arg Asp Val Val
                180   185   190

4

Leu Asn Ala Asp Glu Trp Gly Ile Ser Ala Ala Thr Leu Arg Thr Tyr
    195   200   205

Gln Asn Tyr Leu Lys Asn Tyr Thr Thr Glu Tyr Ser Asn Tyr Cys Ile
    210   215   220

Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Thr Arg Leu His Asp
225   230   235   240

Met Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Phe Glu Tyr Val
                245   250   255

Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser Ser Gly
            260   265   270

Ala Asn Leu Tyr Ala Ser Gly Ser Gly Pro Gln Gln Thr Gln Ser Phe
        275   280   285

Thr Ser Gln Asp Trp Pro Phe Leu Tyr Ser Leu Phe Gln Val Asn Ser
    290   295   300

Asn Tyr Val Leu Asn Gly Phe Ser Gly Ala Arg Leu Thr Gln Thr Phe
305   310   315   320

Pro Asn Ile Gly Gly Leu Pro Gly Thr Thr Thr Thr His Ala Leu Leu
                325   330   335

Ala Ala Arg Val Asn Tyr Ser Gly Gly Val Ser Ser Gly Asp Ile Gly
            340   345   350

Ala Val Phe Asn Gln Asn Phe Ser Cys Ser Thr Phe Leu Pro Pro Leu
        355   360   365

Leu Thr Pro Phe Val Arg Ser Trp Leu Asp Ser Gly Ser Asp Arg Gly
    370   375   380

Gly Val Asn Thr Val Thr Asn Trp Gln Thr Glu Ser Phe Glu Ser Thr
385   390   395   400

Leu Gly Leu Arg Cys Gly Ala Phe Thr Ala Arg Gly Asn Ser Asn Tyr
            405   410   415

Phe Pro Asp Tyr Phe Ile Arg Asn Ile Ser Gly Val Pro Leu Val Val
            420   425   430

5

Arg Asn Glu Asp Leu Arg Arg Pro Leu His Tyr Asn Glu Ile Arg Asn
        435   440   445

Ile Glu Ser Pro Ser Gly Thr Pro Gly Gly Leu Arg Ala Tyr Met Val
        450   455   460

Ser Val His Asn Arg Lys Asn Asn Ile Tyr Ala Val His Glu Asn Gly
465   470   475   480

Thr Met Ile His Leu Ala Pro Glu Asp Tyr Thr Gly Phe Thr Ile Ser
            485   490   495

Pro Ile His Ala Thr Gln Val Asn Asn Gln Thr Arg Thr Phe Ile Ser
            500   505   510

Glu Lys Phe Gly Asn Gln Gly Asp Ser Leu Arg Phe Glu Gln Ser Asn
        515   520   525

Thr Thr Ala Arg Tyr Thr Leu Arg Gly Asn Gly Asn Ser Tyr Asn Leu
        530   535   540

Tyr Leu Arg Val Ser Ser Leu Gly Asn Ser Thr Ile Arg Val Thr Ile
545   550   555   560

Asn Gly Arg Val Tyr Thr Ala Ser Asn Val Asn Thr Thr Thr Asn Asn
                565   570   575

Asp Gly Val Asn Asp Asn Gly Ala Arg Phe Leu Asp Ile Asn Met Gly
            580   585   590

Asn Val Val Ala Ser Asp Asn Thr Asn Val Pro Leu Asp Ile Asn Val
            595   600   605

Thr Phe Asn Ser Gly Thr Gln Phe Glu Leu Met Asn Ile Met Phe Val
        610   615   620

Pro Thr Asn Leu Pro Pro Ile Tyr
625   630

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<212>   DNA
<213>   Bacillus thuringiensis

<220>
<221>   CDS
<222>   (1)..(1896)

6

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atg aat agt gta ttg aat agc gga aga act act att tgt gat gcg tat        48
Met Asn Ser Val Leu Asn Ser Gly Arg Thr Thr Ile Cys Asp Ala Tyr
1               5                   10                  15

aat gta gtg gct cat gat cca ttt agt ttt caa cat aaa tca tta gat        96
Asn Val Val Ala His Asp Pro Phe Ser Phe Gln His Lys Ser Leu Asp
                20                  25                  30

acc ata caa gaa gaa tgg atg gag tgg aaa aaa gat aat cat agt tta       144
Thr Ile Gln Glu Glu Trp Met Glu Trp Lys Lys Asp Asn His Ser Leu
            35                  40                  45

tat gta gat cct att gtt gga act gtg gct agt ttt ctt tta aag aaa       192
Tyr Val Asp Pro Ile Val Gly Thr Val Ala Ser Phe Leu Leu Lys Lys
        50                  55                  60

gtg ggg agt ctt gtt gga aaa aga ata ctg agt gag tta cgg aat tta       240
Val Gly Ser Leu Val Gly Lys Arg Ile Leu Ser Glu Leu Arg Asn Leu
65                  70                  75                  80

ata ttt cct agt ggc agt aca aat cta atg caa gat att tta aga gag       288
Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu Arg Glu
                85                  90                  95

aca gaa aaa ttc ctg aat caa aga ctt aat aca gac act ctt gcc cgt       336
Thr Glu Lys Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu Ala Arg
            100                 105                 110

gta aat gcg gaa ttg aca ggg ctg caa gca aat gta gaa gag ttt aat       384
Val Asn Ala Glu Leu Thr Gly Leu Gln Ala Asn Val Glu Glu Phe Asn
            115                 120                 125

cga caa gta gat aat ttt ttg aac cct aac cga aat gct gtt cct tta       432
Arg Gln Val Asp Asn Phe Leu Asn Pro Asn Arg Asn Ala Val Pro Leu
        130                 135                 140

tca ata act tct tca gtt aat aca atg cag caa tta ttt cta aat aga       480
Ser Ile Thr Ser Ser Val Asn Thr Met Gln Gln Leu Phe Leu Asn Arg
145                 150                 155                 160

tta acc cag ttc cag atg caa gga tac caa ttg tta tta tta cct tta       528
Leu Thr Gln Phe Gln Met Gln Gly Tyr Gln Leu Leu Leu Leu Pro Leu
                165                 170                 175

ttt gca cag gca gcc aat tta cat ctt tct ttt att aga gat gtt att       576
Phe Ala Gln Ala Ala Asn Leu His Leu Ser Phe Ile Arg Asp Val Ile
            180                 185                 190

ctt aat gca gac gaa tgg gga att tca gca gca aca tta cgt acg tat       624
Leu Asn Ala Asp Glu Trp Gly Ile Ser Ala Ala Thr Leu Arg Thr Tyr
            195                 200                 205

caa aat cac ctg aga aat tat aca aga gat tac tct aat tat tgt ata       672
Gln Asn His Leu Arg Asn Tyr Thr Arg Asp Tyr Ser Asn Tyr Cys Ile
            210                 215                 220

aat acg tat caa act gcg ttt aga ggt tta aac acc cgt tta cac gat       720
Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Thr Arg Leu His Asp
225                 230                 235                 240
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7

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atg tta gaa ttt aga aca tat atg ttt tta aat gta ttt gag tat gta        768
Met Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Phe Glu Tyr Val
            245                 250                 255

tct atc tgg tcg ttg ttt aaa tat caa agc ctt cta gtc tct tct ggc        816
Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser Ser Gly
            260                 265                 270

gct aat tta tat gca agt ggt agt gga cca cag cag acc caa tca ttt        864
Ala Asn Leu Tyr Ala Ser Gly Ser Gly Pro Gln Gln Thr Gln Ser Phe
            275                 280                 285

act tca caa gac tgg cca ttt tta tat tct ctt ttc caa gtt aat tca        912
Thr Ser Gln Asp Trp Pro Phe Leu Tyr Ser Leu Phe Gln Val Asn Ser
            290                 295                 300

aat tat gtg tta aat ggc ttt agt ggc gct aga ctt acg cag act ttc        960
Asn Tyr Val Leu Asn Gly Phe Ser Gly Ala Arg Leu Thr Gln Thr Phe
305                 310                 315                 320

cct aat att gtt ggt tta cct ggt act act aca act cac gca ttg ctt       1008
Pro Asn Ile Val Gly Leu Pro Gly Thr Thr Thr Thr His Ala Leu Leu
                    325                 330                 335

gct gca agg gtc aat tac agt gga gga gtt tcg tct ggt gat ata ggc       1056
Ala Ala Arg Val Asn Tyr Ser Gly Gly Val Ser Ser Gly Asp Ile Gly
            340                 345                 350

gct gtg ttt aat caa aat ttt agt tgt agc aca ttt ctc cca cct ttg       1104
Ala Val Phe Asn Gln Asn Phe Ser Cys Ser Thr Phe Leu Pro Pro Leu
            355                 360                 365

tta aca cca ttt gtt agg agt tgg cta gat tca ggt tca gat cgg ggg       1152
Leu Thr Pro Phe Val Arg Ser Trp Leu Asp Ser Gly Ser Asp Arg Gly
            370                 375                 380

ggg atc aat acc gtt acc aat tgg caa aca gaa tcc ttt gag aca act       1200
Gly Ile Asn Thr Val Thr Asn Trp Gln Thr Glu Ser Phe Glu Thr Thr
385                 390                 395                 400

tta ggt tta agg agt ggt gct ttt aca gct cga ggt aat tca aac tat       1248
Leu Gly Leu Arg Ser Gly Ala Phe Thr Ala Arg Gly Asn Ser Asn Tyr
                    405                 410                 415

ttc cca gat tat ttt atc cgt aat att tcc gga gtt cct tta gtt gtt       1296
Phe Pro Asp Tyr Phe Ile Arg Asn Ile Ser Gly Val Pro Leu Val Val
            420                 425                 430

aga aat gaa gat tta aga aga ccg tta cac tat aat caa ata aga aat       1344
Arg Asn Glu Asp Leu Arg Arg Pro Leu His Tyr Asn Gln Ile Arg Asn
            435                 440                 445

ata gaa agt cct tca gga aca cct ggt gga tta cga gct tat atg gta       1392
Ile Glu Ser Pro Ser Gly Thr Pro Gly Gly Leu Arg Ala Tyr Met Val
            450                 455                 460

tct gtg cat aac aga aaa aat aat atc tat gcc gtt cat gaa aat ggt       1440
Ser Val His Asn Arg Lys Asn Asn Ile Tyr Ala Val His Glu Asn Gly
465                 470                 475                 480
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act atg att cat tta gcg ccg gaa gat tat aca gga ttt act ata tcg    1488
Thr Met Ile His Leu Ala Pro Glu Asp Tyr Thr Gly Phe Thr Ile Ser
            485             490             495

ccg ata cat gca act caa gtg aat aat caa acg cga aca ttt att tct    1536
Pro Ile His Ala Thr Gln Val Asn Asn Gln Thr Arg Thr Phe Ile Ser
            500             505             510

gaa aaa ttt gga aat caa ggt gat tcc tta aga ttt gaa caa agc aac    1584
Glu Lys Phe Gly Asn Gln Gly Asp Ser Leu Arg Phe Glu Gln Ser Asn
            515             520             525

acg aca gct cgt tat aca ctt aga ggg aat gga aat agt tac aat ctt    1632
Thr Thr Ala Arg Tyr Thr Leu Arg Gly Asn Gly Asn Ser Tyr Asn Leu
            530             535             540

tat tta aga gta tct tca ata gga aat tcc act att cga gtt act ata    1680
Tyr Leu Arg Val Ser Ser Ile Gly Asn Ser Thr Ile Arg Val Thr Ile
545             550             555             560

aac ggt aga gtt tat act gct tca aat gtt aat act act aca aat aac    1728
Asn Gly Arg Val Tyr Thr Ala Ser Asn Val Asn Thr Thr Thr Asn Asn
            565             570             575

gat gga gtt aat gat aat gga gct cgt ttt tca gat att aat att ggt    1776
Asp Gly Val Asn Asp Asn Gly Ala Arg Phe Ser Asp Ile Asn Ile Gly
            580             585             590

aat gta gta gca agt gat aat act aat gta ccg tta gat ata aac gtg    1824
Asn Val Val Ala Ser Asp Asn Thr Asn Val Pro Leu Asp Ile Asn Val
            595             600             605

aca tta aat tct ggt act caa ttt gag ctt atg aat att atg ttt gtt    1872
Thr Leu Asn Ser Gly Thr Gln Phe Glu Leu Met Asn Ile Met Phe Val
            610             615             620

cca act aat atc tca cca ctt tat taa                                1899
Pro Thr Asn Ile Ser Pro Leu Tyr
625             630


<210>  4
<211>  632
<212>  PRT
<213>  Bacillus thuringiensis

<400>  4

Met Asn Ser Val Leu Asn Ser Gly Arg Thr Thr Ile Cys Asp Ala Tyr
1               5               10              15


Asn Val Val Ala His Asp Pro Phe Ser Phe Gln His Lys Ser Leu Asp
            20              25              30


Thr Ile Gln Glu Glu Trp Met Glu Trp Lys Lys Asp Asn His Ser Leu
            35              40              45


Tyr Val Asp Pro Ile Val Gly Thr Val Ala Ser Phe Leu Leu Lys Lys
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9

Val Gly Ser Leu Val Gly Lys Arg Ile Leu Ser Glu Leu Arg Asn Leu
65   70   75   80

Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu Arg Glu
                85   90   95

Thr Glu Lys Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu Ala Arg
            100   105   110

Val Asn Ala Glu Leu Thr Gly Leu Gln Ala Asn Val Glu Glu Phe Asn
        115   120   125

Arg Gln Val Asp Asn Phe Leu Asn Pro Asn Arg Asn Ala Val Pro Leu
    130   135   140

Ser Ile Thr Ser Ser Val Asn Thr Met Gln Gln Leu Phe Leu Asn Arg
145   150   155   160

Leu Thr Gln Phe Gln Met Gln Gly Tyr Gln Leu Leu Leu Leu Pro Leu
                165   170   175

Phe Ala Gln Ala Ala Asn Leu His Leu Ser Phe Ile Arg Asp Val Ile
            180   185   190

Leu Asn Ala Asp Glu Trp Gly Ile Ser Ala Ala Thr Leu Arg Thr Tyr
        195   200   205

Gln Asn His Leu Arg Asn Tyr Thr Arg Asp Tyr Ser Asn Tyr Cys Ile
    210   215   220

Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Thr Arg Leu His Asp
225   230   235   240

Met Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Phe Glu Tyr Val
                245   250   255

Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser Ser Gly
            260   265   270

Ala Asn Leu Tyr Ala Ser Gly Ser Gly Pro Gln Gln Thr Gln Ser Phe
        275   280   285

Thr Ser Gln Asp Trp Pro Phe Leu Tyr Ser Leu Phe Gln Val Asn Ser

Asn Tyr Val Leu Asn Gly Phe Ser Gly Ala Arg Leu Thr Gln Thr Phe
305   310   315   320

Pro Asn Ile Val Gly Leu Pro Gly Thr Thr Thr Thr His Ala Leu Leu
             325   330   335

Ala Ala Arg Val Asn Tyr Ser Gly Gly Val Ser Ser Gly Asp Ile Gly
         340   345   350

Ala Val Phe Asn Gln Asn Phe Ser Cys Ser Thr Phe Leu Pro Pro Leu
         355   360   365

Leu Thr Pro Phe Val Arg Ser Trp Leu Asp Ser Gly Ser Asp Arg Gly
         370   375   380

Gly Ile Asn Thr Val Thr Asn Trp Gln Thr Glu Ser Phe Glu Thr Thr
385   390   395   400

Leu Gly Leu Arg Ser Gly Ala Phe Thr Ala Arg Gly Asn Ser Asn Tyr
             405   410   415

Phe Pro Asp Tyr Phe Ile Arg Asn Ile Ser Gly Val Pro Leu Val Val
             420   425   430

Arg Asn Glu Asp Leu Arg Arg Pro Leu His Tyr Asn Gln Ile Arg Asn
         435   440   445

Ile Glu Ser Pro Ser Gly Thr Pro Gly Gly Leu Arg Ala Tyr Met Val
         450   455   460

Ser Val His Asn Arg Lys Asn Asn Ile Tyr Ala Val His Glu Asn Gly
465   470   475   480

Thr Met Ile His Leu Ala Pro Glu Asp Tyr Thr Gly Phe Thr Ile Ser
             485   490   495

Pro Ile His Ala Thr Gln Val Asn Asn Gln Thr Arg Thr Phe Ile Ser
             500   505   510

Glu Lys Phe Gly Asn Gln Gly Asp Ser Leu Arg Phe Glu Gln Ser Asn
         515   520   525

Thr Thr Ala Arg Tyr Thr Leu Arg Gly Asn Gly Asn Ser Tyr Asn Leu
         530   535   540

11

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Tyr Leu Arg Val Ser Ser Ile Gly Asn Ser Thr Ile Arg Val Thr Ile
545                 550                 555                 560


Asn Gly Arg Val Tyr Thr Ala Ser Asn Val Asn Thr Thr Thr Asn Asn
                565                 570                 575


Asp Gly Val Asn Asp Asn Gly Ala Arg Phe Ser Asp Ile Asn Ile Gly
            580                 585                 590


Asn Val Val Ala Ser Asp Asn Thr Asn Val Pro Leu Asp Ile Asn Val
            595                 600                 605


Thr Leu Asn Ser Gly Thr Gln Phe Glu Leu Met Asn Ile Met Phe Val
        610                 615                 620


Pro Thr Asn Ile Ser Pro Leu Tyr
625                 630


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<211>   1884
<212>   DNA
<213>   Bacillus thuringiensis

<220>
<221>   CDS
<222>   (1)..(1881)

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atg aat aat gta ttg aat agc gaa aga act act aag tgt ggt gcg tat        48
Met Asn Asn Val Leu Asn Ser Glu Arg Thr Thr Lys Cys Gly Ala Tyr
1               5                   10                  15

aac gta gtg gct cat gat cca ttc agt ttt gaa cat aaa tca tta gat        96
Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser Leu Asp
                20                  25                  30

acc ata caa aaa gaa tgg atg gag tgg aaa aga act gat cat agt tta       144
Thr Ile Gln Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His Ser Leu
            35                  40                  45

tat gta tct cct att gta gga act ata gcc agt ttt ctg tta aag aaa       192
Tyr Val Ser Pro Ile Val Gly Thr Ile Ala Ser Phe Leu Leu Lys Lys
        50                  55                  60

ata gga ggg ctt ata gga aaa aga ata tta agt gag tta aag aat tta       240
Ile Gly Gly Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Lys Asn Leu
65                  70                  75                  80

att ttt cct agt ggt agt ata gaa tca atg caa gat att tta aga ggg       288
Ile Phe Pro Ser Gly Ser Ile Glu Ser Met Gln Asp Ile Leu Arg Gly
                85                  90                  95
```

12

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gca gaa caa ttt cta aat caa aga ctt gat gca gac acc ttt agt cgt         336
Ala Glu Gln Phe Leu Asn Gln Arg Leu Asp Ala Asp Thr Phe Ser Arg
            100                 105                 110

gta gaa gca gaa ttg aga ggg ctt caa gca aat gta gag gaa ttt aat         384
Val Glu Ala Glu Leu Arg Gly Leu Gln Ala Asn Val Glu Glu Phe Asn
            115                 120                 125

cga caa gtg gac aat ttt tta aac cca aat caa aac cct gcc cct tta         432
Arg Gln Val Asp Asn Phe Leu Asn Pro Asn Gln Asn Pro Ala Pro Leu
        130                 135                 140

gca ata att gat tcg gtt aat aca ttg caa caa tta ttc cta agt aga         480
Ala Ile Ile Asp Ser Val Asn Thr Leu Gln Gln Leu Phe Leu Ser Arg
145                 150                 155                 160

tta ccc cag ttc cag ata caa cgc tat cag cta tta tta tta cct tta         528
Leu Pro Gln Phe Gln Ile Gln Arg Tyr Gln Leu Leu Leu Leu Pro Leu
                165                 170                 175

ttt gca caa gca gcc aat tta cac ctt tct ttt att aga gac gtt att         576
Phe Ala Gln Ala Ala Asn Leu His Leu Ser Phe Ile Arg Asp Val Ile
                180                 185                 190

ctt aat gca gat gaa tgg gga ata cca gct gca acg gtg cgc aca tat         624
Leu Asn Ala Asp Glu Trp Gly Ile Pro Ala Ala Thr Val Arg Thr Tyr
            195                 200                 205

aga gag cac cta caa aga tat aca cgc gaa tac tcc aat tat tgt ata         672
Arg Glu His Leu Gln Arg Tyr Thr Arg Glu Tyr Ser Asn Tyr Cys Ile
            210                 215                 220

aat acg tat caa act gcg ttt aga ggg tta aat gcc act tta cac gat         720
Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Ala Thr Leu His Asp
225                 230                 235                 240

ttt cta gaa ttt aga aca tat atg ttt tta aat gta tta gac tat gta         768
Phe Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Leu Asp Tyr Val
                245                 250                 255

tct atc tgg tcg ttg ttt aaa tat cag agc ctt ctg gta tcc tct ggc         816
Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser Ser Gly
            260                 265                 270

gct aat tta tat gcg agt ggt agt gga gta aca aat aga caa tca ttt         864
Ala Asn Leu Tyr Ala Ser Gly Ser Gly Val Thr Asn Arg Gln Ser Phe
            275                 280                 285

act gca caa gac tgg cca ttt tta aat tct ctt ttc caa gtt aat caa         912
Thr Ala Gln Asp Trp Pro Phe Leu Asn Ser Leu Phe Gln Val Asn Gln
        290                 295                 300

aat tat gta tta aca ggt atg aat ggt tat agg tat act tta agt tct         960
Asn Tyr Val Leu Thr Gly Met Asn Gly Tyr Arg Tyr Thr Leu Ser Ser
305                 310                 315                 320

gtt ttt ggt aca aat caa aca ata cat tct gtt agg agt aat tat agg        1008
Val Phe Gly Thr Asn Gln Thr Ile His Ser Val Arg Ser Asn Tyr Arg
                325                 330                 335

ggc ggg gtt tca tct ggt tac att gga gtt aat ctt agt gaa ggt gac        1056
```

13

```
Gly Gly Val Ser Ser Gly Tyr Ile Gly Val Asn Leu Ser Glu Gly Asp
            340                 345                 350

caa aat ttt agt tgt agt aca ttt ttg gat cct tta gaa aca ccg ttt        1104
Gln Asn Phe Ser Cys Ser Thr Phe Leu Asp Pro Leu Glu Thr Pro Phe
            355                 360                 365

att aga agt tgg ctg gat tca ggt agc gat gat ggc ttt aat tgg agt        1152
Ile Arg Ser Trp Leu Asp Ser Gly Ser Asp Asp Gly Phe Asn Trp Ser
            370                 375                 380

aca gga gtc ttt aca aca act att ggt tta cct act tgt agc att ttt        1200
Thr Gly Val Phe Thr Thr Thr Ile Gly Leu Pro Thr Cys Ser Ile Phe
385                 390                 395                 400

tgg cct cgt ggt aac tcg aac tat ttt cca gat tat ttt ata cga aat        1248
Trp Pro Arg Gly Asn Ser Asn Tyr Phe Pro Asp Tyr Phe Ile Arg Asn
                    405                 410                 415

att tct ggt gtc gtt ggt cgt ctt agg aac gaa gat tta aga aga cca        1296
Ile Ser Gly Val Val Gly Arg Leu Arg Asn Glu Asp Leu Arg Arg Pro
                    420                 425                 430

cta tat ttt aat gag ata aga aat ata gta gga aat aac aat cca ccg        1344
Leu Tyr Phe Asn Glu Ile Arg Asn Ile Val Gly Asn Asn Asn Pro Pro
                    435                 440                 445

gca act gga tcg tta tca gtc gcc agc cta gtc tct gtg cat aac aga        1392
Ala Thr Gly Ser Leu Ser Val Ala Ser Leu Val Ser Val His Asn Arg
            450                 455                 460

aaa aat aat att tat gct gct cat gaa aat ggt act atg att cat ttg        1440
Lys Asn Asn Ile Tyr Ala Ala His Glu Asn Gly Thr Met Ile His Leu
465                 470                 475                 480

gca ccg gaa gat tat aca ggt ttc aca atg tca cca ata cat gca act        1488
Ala Pro Glu Asp Tyr Thr Gly Phe Thr Met Ser Pro Ile His Ala Thr
                    485                 490                 495

caa gta aat aat caa aca cga aca ttt att tcc gag aaa tta gga aac        1536
Gln Val Asn Asn Gln Thr Arg Thr Phe Ile Ser Glu Lys Leu Gly Asn
                    500                 505                 510

caa ggt gat tcc ttg aga ttt gaa caa aca aat aca acg gct cga tac        1584
Gln Gly Asp Ser Leu Arg Phe Glu Gln Thr Asn Thr Thr Ala Arg Tyr
            515                 520                 525

aca ttt aga ggg aat gga aat agt tac aat ctt tat tta aga gta tct        1632
Thr Phe Arg Gly Asn Gly Asn Ser Tyr Asn Leu Tyr Leu Arg Val Ser
            530                 535                 540

tca cta gga aat tcc aca att cga gtt act ata aac ggt aga gtt tat        1680
Ser Leu Gly Asn Ser Thr Ile Arg Val Thr Ile Asn Gly Arg Val Tyr
545                 550                 555                 560

act gtt tca aac gtc aat act act aca aat aac gat gga gtt gtt gat        1728
Thr Val Ser Asn Val Asn Thr Thr Thr Asn Asn Asp Gly Val Val Asp
                    565                 570                 575

aat ggc gct cgt ttt tca gat att aat ata ggt aat gta gtg gca agt        1776
Asn Gly Ala Arg Phe Ser Asp Ile Asn Ile Gly Asn Val Val Ala Ser
```

14

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gct aat act aat ata cca tta gat ata aat gta aca ttt aac tct ggt       1824
Ala Asn Thr Asn Ile Pro Leu Asp Ile Asn Val Thr Phe Asn Ser Gly
        595                 600                 605

acg caa ttt gag ctt atg aat att atg ttt gtt cca act aat att cca       1872
Thr Gln Phe Glu Leu Met Asn Ile Met Phe Val Pro Thr Asn Ile Pro
        610                 615                 620

cca att tat taa                                                       1884
Pro Ile Tyr
625
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<210> 6
<211> 627
<212> PRT
<213> Bacillus thuringiensis

<400> 6

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Met Asn Asn Val Leu Asn Ser Glu Arg Thr Thr Lys Cys Gly Ala Tyr
1               5                   10                  15


Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser Leu Asp
            20                  25                  30


Thr Ile Gln Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His Ser Leu
        35                  40                  45


Tyr Val Ser Pro Ile Val Gly Thr Ile Ala Ser Phe Leu Leu Lys Lys
    50                  55                  60


Ile Gly Gly Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Lys Asn Leu
65                  70                  75                  80


Ile Phe Pro Ser Gly Ser Ile Glu Ser Met Gln Asp Ile Leu Arg Gly
            85                  90                  95


Ala Glu Gln Phe Leu Asn Gln Arg Leu Asp Ala Asp Thr Phe Ser Arg
            100                 105                 110


Val Glu Ala Glu Leu Arg Gly Leu Gln Ala Asn Val Glu Glu Phe Asn
            115                 120                 125


Arg Gln Val Asp Asn Phe Leu Asn Pro Asn Gln Asn Pro Ala Pro Leu
    130                 135                 140


Ala Ile Ile Asp Ser Val Asn Thr Leu Gln Gln Leu Phe Leu Ser Arg
145                 150                 155                 160
```

15

```
Leu Pro Gln Phe Gln Ile Gln Arg Tyr Gln Leu Leu Leu Leu Pro Leu
            165                 170                 175

Phe Ala Gln Ala Ala Asn Leu His Leu Ser Phe Ile Arg Asp Val Ile
            180                 185                 190

Leu Asn Ala Asp Glu Trp Gly Ile Pro Ala Ala Thr Val Arg Thr Tyr
            195                 200                 205

Arg Glu His Leu Gln Arg Tyr Thr Arg Glu Tyr Ser Asn Tyr Cys Ile
            210                 215                 220

Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Ala Thr Leu His Asp
225                 230                 235                 240

Phe Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Leu Asp Tyr Val
            245                 250                 255

Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser Ser Gly
            260                 265                 270

Ala Asn Leu Tyr Ala Ser Gly Ser Gly Val Thr Asn Arg Gln Ser Phe
            275                 280                 285

Thr Ala Gln Asp Trp Pro Phe Leu Asn Ser Leu Phe Gln Val Asn Gln
            290                 295                 300

Asn Tyr Val Leu Thr Gly Met Asn Gly Tyr Arg Tyr Thr Leu Ser Ser
305                 310                 315                 320

Val Phe Gly Thr Asn Gln Thr Ile His Ser Val Arg Ser Asn Tyr Arg
            325                 330                 335

Gly Gly Val Ser Ser Gly Tyr Ile Gly Val Asn Leu Ser Glu Gly Asp
            340                 345                 350

Gln Asn Phe Ser Cys Ser Thr Phe Leu Asp Pro Leu Glu Thr Pro Phe
            355                 360                 365

Ile Arg Ser Trp Leu Asp Ser Gly Ser Asp Asp Gly Phe Asn Trp Ser
            370                 375                 380

Thr Gly Val Phe Thr Thr Thr Ile Gly Leu Pro Thr Cys Ser Ile Phe
385                 390                 395                 400
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16

Trp Pro Arg Gly Asn Ser Asn Tyr Phe Pro Asp Tyr Phe Ile Arg Asn
                    405   410   415

Ile Ser Gly Val Val Gly Arg Leu Arg Asn Glu Asp Leu Arg Arg Pro
                420   425   430

Leu Tyr Phe Asn Glu Ile Arg Asn Ile Val Gly Asn Asn Asn Pro Pro
            435   440   445

Ala Thr Gly Ser Leu Ser Val Ala Ser Leu Val Ser Val His Asn Arg
    450   455   460

Lys Asn Asn Ile Tyr Ala Ala His Glu Asn Gly Thr Met Ile His Leu
465   470   475   480

Ala Pro Glu Asp Tyr Thr Gly Phe Thr Met Ser Pro Ile His Ala Thr
                485   490   495

Gln Val Asn Asn Gln Thr Arg Thr Phe Ile Ser Glu Lys Leu Gly Asn
                500   505   510

Gln Gly Asp Ser Leu Arg Phe Glu Gln Thr Asn Thr Thr Ala Arg Tyr
            515   520   525

Thr Phe Arg Gly Asn Gly Asn Ser Tyr Asn Leu Tyr Leu Arg Val Ser
    530   535   540

Ser Leu Gly Asn Ser Thr Ile Arg Val Thr Ile Asn Gly Arg Val Tyr
545   550   555   560

Thr Val Ser Asn Val Asn Thr Thr Thr Asn Asn Asp Gly Val Val Asp
                565   570   575

Asn Gly Ala Arg Phe Ser Asp Ile Asn Ile Gly Asn Val Val Ala Ser
            580   585   590

Ala Asn Thr Asn Ile Pro Leu Asp Ile Asn Val Thr Phe Asn Ser Gly
        595   600   605

Thr Gln Phe Glu Leu Met Asn Ile Met Phe Val Pro Thr Asn Ile Pro
    610   615   620

Pro Ile Tyr
625

<210>   7

<211> 1910
<212> DNA
<213> Artificial Sequence

<220>
<223> artificial cry2Ae DNA sequence for expression in cotton
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<220>
<221> CDS
<222> (3)..(1901)

<400> 7

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cc atg gct aac aac gtt ctt aac aac ggt agg act act att tgc gat        47
   Met Ala Asn Asn Val Leu Asn Asn Gly Arg Thr Thr Ile Cys Asp
   1               5                   10                  15

gca tac aac gtt gtt gct cat gat cct ttc tct ttc gag cat aag tct       95
Ala Tyr Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser
                20                  25                  30

ctt gat aca att agg aag gag tgg atg gag tgg aag agg act gat cat       143
Leu Asp Thr Ile Arg Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His
            35                  40                  45

tct ctt tac gtt gct cct att gtt ggt act gtt tct tct ttc ctt ctt      191
Ser Leu Tyr Val Ala Pro Ile Val Gly Thr Val Ser Ser Phe Leu Leu
        50                  55                  60

aag aag gtt ggt tct ctt atc ggt aag agg atc ctt tct gag ctt tgg      239
Lys Lys Val Gly Ser Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Trp
    65                  70                  75

ggt ctt atc ttc cct tct ggt tct act aac ctt atg caa gat att ctt      287
Gly Leu Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu
80                  85                  90                  95

agg gag act gaa caa ttc ctt aac cag agg ctt aac act gat act ctt      335
Arg Glu Thr Glu Gln Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu
                100                 105                 110

gct agg gtt aac gct gag ctt gag ggt ctt caa gct aac att agg gaa      383
Ala Arg Val Asn Ala Glu Leu Glu Gly Leu Gln Ala Asn Ile Arg Glu
            115                 120                 125

ttc aac cag caa gtt gat aac ttc ctt aac cct act caa aac cct gtt      431
Phe Asn Gln Gln Val Asp Asn Phe Leu Asn Pro Thr Gln Asn Pro Val
        130                 135                 140

cct ctt tct att act tct tct gtt aac act atg caa caa ctt ttc ctt      479
Pro Leu Ser Ile Thr Ser Ser Val Asn Thr Met Gln Gln Leu Phe Leu
    145                 150                 155

aac agg ctt cct caa ttc agg gtt caa ggt tac caa ctt ctt ctt ctt      527
Asn Arg Leu Pro Gln Phe Arg Val Gln Gly Tyr Gln Leu Leu Leu Leu
160                 165                 170                 175

cct ctt ttc gct caa gct gct aac atg cac cta agc ttc att agg gat      575
Pro Leu Phe Ala Gln Ala Ala Asn Met His Leu Ser Phe Ile Arg Asp
                180                 185                 190
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18

```
gtt gtt ctt aac gct gat gag tgg ggt att tct gct gct act ctt agg        623
Val Val Leu Asn Ala Asp Glu Trp Gly Ile Ser Ala Ala Thr Leu Arg
            195                 200                 205

act tac caa aac tac ctt aag aac tac act act gag tac tct aac tac        671
Thr Tyr Gln Asn Tyr Leu Lys Asn Tyr Thr Thr Glu Tyr Ser Asn Tyr
            210                 215                 220

tgc att aac act tac caa act gct ttc agg ggt ctt aac act agg ctt        719
Cys Ile Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Thr Arg Leu
    225                 230                 235

cat gat atg ctt gag ttc agg act tac atg ttc ctt aac gtt ttc gag        767
His Asp Met Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Phe Glu
240                 245                 250                 255

tac gtt tct att tgg tct ctt ttc aag tac cag tct ctt ctt gtt tct        815
Tyr Val Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser
                260                 265                 270

tct ggt gct aac ctt tac gct tct ggt tct ggt cct caa caa act caa        863
Ser Gly Ala Asn Leu Tyr Ala Ser Gly Ser Gly Pro Gln Gln Thr Gln
            275                 280                 285

tct ttc act tct caa gac tgg cct ttc ctt tac tct ctt ttc caa gtt        911
Ser Phe Thr Ser Gln Asp Trp Pro Phe Leu Tyr Ser Leu Phe Gln Val
            290                 295                 300

aac tct aac tac gtt ctt aac ggt ttc tct ggt gct agg ctt act caa        959
Asn Ser Asn Tyr Val Leu Asn Gly Phe Ser Gly Ala Arg Leu Thr Gln
        305                 310                 315

act ttc cct aac atc ggt ggt ctt cct ggt act act act act cat gct       1007
Thr Phe Pro Asn Ile Gly Gly Leu Pro Gly Thr Thr Thr Thr His Ala
320                 325                 330                 335

ctt ctt gct gct agg gtt aac tac tct ggt ggt gtt tct tct ggt gat       1055
Leu Leu Ala Ala Arg Val Asn Tyr Ser Gly Gly Val Ser Ser Gly Asp
            340                 345                 350

atc ggt gct gtt ttc aac cag aac ttc tct tgc tct act ttc ctt cct       1103
Ile Gly Ala Val Phe Asn Gln Asn Phe Ser Cys Ser Thr Phe Leu Pro
            355                 360                 365

cct ctt ctt act cct ttc gtt agg tct tgg ctt gat tct ggt tct gat       1151
Pro Leu Leu Thr Pro Phe Val Arg Ser Trp Leu Asp Ser Gly Ser Asp
        370                 375                 380

agg ggt ggt gtt aac act gtt act aac tgg caa act gag tct ttc gag       1199
Arg Gly Gly Val Asn Thr Val Thr Asn Trp Gln Thr Glu Ser Phe Glu
    385                 390                 395

tct act ctt ggt ctt agg tgc ggt gct ttc act gct agg ggt aac tct       1247
Ser Thr Leu Gly Leu Arg Cys Gly Ala Phe Thr Ala Arg Gly Asn Ser
400                 405                 410                 415

aac tac ttc cct gat tac ttc att agg aac att tct ggt gtt cct ctt       1295
Asn Tyr Phe Pro Asp Tyr Phe Ile Arg Asn Ile Ser Gly Val Pro Leu
                420                 425                 430

gtt gtt agg aac gag gat ctt agg agg cct ctt cat tac aac gag att       1343
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19

```
Val Val Arg Asn Glu Asp Leu Arg Arg Pro Leu His Tyr Asn Glu Ile
            435                 440                 445

agg aac att gag tct cct tct ggt act cct ggt ggt ctt agg gct tac    1391
Arg Asn Ile Glu Ser Pro Ser Gly Thr Pro Gly Gly Leu Arg Ala Tyr
            450                 455                 460

atg gtt tct gtt cat aac agg aag aac aac atc tac gct gtt cat gag    1439
Met Val Ser Val His Asn Arg Lys Asn Asn Ile Tyr Ala Val His Glu
            465                 470                 475

aac ggt act atg att cat ctt gct cct gag gat tac acc ggt ttc acc    1487
Asn Gly Thr Met Ile His Leu Ala Pro Glu Asp Tyr Thr Gly Phe Thr
480                 485                 490                 495

atc tcc ccc atc cac gcc acc cag gtc aat aat cag acc agg acc ttc    1535
Ile Ser Pro Ile His Ala Thr Gln Val Asn Asn Gln Thr Arg Thr Phe
                500                 505                 510

atc tcc gag aag ttc ggc aac cag ggc gac tcc ctg agg ttc gag cag    1583
Ile Ser Glu Lys Phe Gly Asn Gln Gly Asp Ser Leu Arg Phe Glu Gln
            515                 520                 525

tcc aac acc acc gcc agg tac acc ctg agg ggc aac ggc aac tcc tac    1631
Ser Asn Thr Thr Ala Arg Tyr Thr Leu Arg Gly Asn Gly Asn Ser Tyr
            530                 535                 540

aac ctg tac ctc agg gtg tcc tcc ctc ggc aac tcc acc atc agg gtc    1679
Asn Leu Tyr Leu Arg Val Ser Ser Leu Gly Asn Ser Thr Ile Arg Val
            545                 550                 555

acc atc aac ggc agg gtg tac acc gcc tcc aac gtg aac acc acc acc    1727
Thr Ile Asn Gly Arg Val Tyr Thr Ala Ser Asn Val Asn Thr Thr Thr
560                 565                 570                 575

aac aac gac ggc gtc aac gac aac ggc gct agg ttc ctg gac atc aac    1775
Asn Asn Asp Gly Val Asn Asp Asn Gly Ala Arg Phe Leu Asp Ile Asn
                580                 585                 590

atg ggc aac gtc gtg gcc tcc gac aac acc aac gtg ccc ctg gac atc    1823
Met Gly Asn Val Val Ala Ser Asp Asn Thr Asn Val Pro Leu Asp Ile
                595                 600                 605

aac gtg aca ttt aac tcc ggc acc cag ttc gag ctg atg aac atc atg    1871
Asn Val Thr Phe Asn Ser Gly Thr Gln Phe Glu Leu Met Asn Ile Met
            610                 615                 620

ttc gtg cca act aac ctc cca ccc atc tac tgagctagc                  1910
Phe Val Pro Thr Asn Leu Pro Pro Ile Tyr
            625                 630


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<211>  633
<212>  PRT
<213>  Artificial Sequence

<400>  8

Met Ala Asn Asn Val Leu Asn Asn Gly Arg Thr Thr Ile Cys Asp Ala
1               5                   10                  15
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20

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Tyr Asn Val Val Ala His Asp Pro Phe Ser Phe Glu His Lys Ser Leu
        20                  25                  30

Asp Thr Ile Arg Lys Glu Trp Met Glu Trp Lys Arg Thr Asp His Ser
        35                  40                  45

Leu Tyr Val Ala Pro Ile Val Gly Thr Val Ser Ser Phe Leu Leu Lys
        50                  55                  60

Lys Val Gly Ser Leu Ile Gly Lys Arg Ile Leu Ser Glu Leu Trp Gly
65                  70                  75                  80

Leu Ile Phe Pro Ser Gly Ser Thr Asn Leu Met Gln Asp Ile Leu Arg
                85                  90                  95

Glu Thr Glu Gln Phe Leu Asn Gln Arg Leu Asn Thr Asp Thr Leu Ala
            100                 105                 110

Arg Val Asn Ala Glu Leu Glu Gly Leu Gln Ala Asn Ile Arg Glu Phe
            115                 120                 125

Asn Gln Gln Val Asp Asn Phe Leu Asn Pro Thr Gln Asn Pro Val Pro
    130                 135                 140

Leu Ser Ile Thr Ser Ser Val Asn Thr Met Gln Gln Leu Phe Leu Asn
145                 150                 155                 160

Arg Leu Pro Gln Phe Arg Val Gln Gly Tyr Gln Leu Leu Leu Leu Pro
                165                 170                 175

Leu Phe Ala Gln Ala Ala Asn Met His Leu Ser Phe Ile Arg Asp Val
                180                 185                 190

Val Leu Asn Ala Asp Glu Trp Gly Ile Ser Ala Ala Thr Leu Arg Thr
                195                 200                 205

Tyr Gln Asn Tyr Leu Lys Asn Tyr Thr Thr Glu Tyr Ser Asn Tyr Cys
    210                 215                 220

Ile Asn Thr Tyr Gln Thr Ala Phe Arg Gly Leu Asn Thr Arg Leu His
225                 230                 235                 240

Asp Met Leu Glu Phe Arg Thr Tyr Met Phe Leu Asn Val Phe Glu Tyr
                245                 250                 255
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Val Ser Ile Trp Ser Leu Phe Lys Tyr Gln Ser Leu Leu Val Ser Ser
        260   265   270

Gly Ala Asn Leu Tyr Ala Ser Gly Ser Gly Pro Gln Gln Thr Gln Ser
        275   280   285

Phe Thr Ser Gln Asp Trp Pro Phe Leu Tyr Ser Leu Phe Gln Val Asn
        290   295   300

Ser Asn Tyr Val Leu Asn Gly Phe Ser Gly Ala Arg Leu Thr Gln Thr
305   310   315   320

Phe Pro Asn Ile Gly Gly Leu Pro Gly Thr Thr Thr Thr His Ala Leu
                325   330   335

Leu Ala Ala Arg Val Asn Tyr Ser Gly Gly Val Ser Ser Gly Asp Ile
            340   345   350

Gly Ala Val Phe Asn Gln Asn Phe Ser Cys Ser Thr Phe Leu Pro Pro
        355   360   365

Leu Leu Thr Pro Phe Val Arg Ser Trp Leu Asp Ser Gly Ser Asp Arg
    370   375   380

Gly Gly Val Asn Thr Val Thr Asn Trp Gln Thr Glu Ser Phe Glu Ser
385   390   395   400

Thr Leu Gly Leu Arg Cys Gly Ala Phe Thr Ala Arg Gly Asn Ser Asn
            405   410   415

Tyr Phe Pro Asp Tyr Phe Ile Arg Asn Ile Ser Gly Val Pro Leu Val
            420   425   430

Val Arg Asn Glu Asp Leu Arg Arg Pro Leu His Tyr Asn Glu Ile Arg
        435   440   445

Asn Ile Glu Ser Pro Ser Gly Thr Pro Gly Gly Leu Arg Ala Tyr Met
    450   455   460

Val Ser Val His Asn Arg Lys Asn Asn Ile Tyr Ala Val His Glu Asn
465   470   475   480

Gly Thr Met Ile His Leu Ala Pro Glu Asp Tyr Thr Gly Phe Thr Ile
                485   490   495